

TN SERIES – Extremely Low Impedance Series

◆ Applicable Standard

Characteristic W of JIS C 5141

◆ Operating Temperature Range

-40°C~+105°C

◆ Rated Working Voltage

6.3~50 V.DC

◆ Rated Voltage and Surge Voltage

Rated Voltage (V)	6.3	10	16	25	35	50
Surge Voltage (V)	8	13	20	32	44	63

◆ DC Leakage Current

Applying the rated DC voltage to the capacitor. The leakage current is measured at 2 minutes after the DC voltage across the capacitor reached the rated voltage. The leakage current shall not exceed the value below. (at 25°C)

$$I \leq 0.01 CV \text{ or } 3 \mu A, \text{ whichever is greater after 2 minutes.}$$

Where, I: Leakage Current (μA) C: Nominal Capacitance (μF)

V: Rated Voltage (V)

◆ Capacitance Tolerance

The capacitance shall be within the following tolerance to the nominal capacitance.

-20%~+20% (at 25°C, 120Hz)

◆ Tangent of Loss Angle (Tan δ)

Tan δ shall not exceed the value below. (at 25°C, 120Hz)

When nominal capacitance is over 1000 μF . Tan δ shall be added 0.02 to the listed value with increase of every 1000 μF .

Rated Voltage (V)	6.3	10	16	25	35	50
Tan δ	0.22	0.19	0.16	0.14	0.12	0.10

◆ Temperature Characteristics

Impedance ratio of the -25°C or -40°C value to the 25°C value shall not exceed the value below. (at 120Hz)

Rated Voltage (V)	6.3	10	16	25	35	50
Z(-40°C)/Z(+25°C)	3		2			
Z(-40°C)/Z(+25°C)	4		3			

◆ Load Life

The following specifications shall be satisfied when the capacitors are restored to 25°C after the rated voltage is applied for (5Φ~8Φ)2000 hours or (10Φ~18Φ)3000~5000 hours at 105°C.

Capacitance Change	±20% of the initial measured value.
Tan δ	≤ 200% of the initial specified value.
Leakage Current	≤ The initial specified value.

◆ Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 25°C after exposing them for 1000 hours at 105°C without voltage applied. The capacitors shall be subjected to voltage treatment specified in item 4.4 of JIS C 5102, before the measurements.(except 500 hour forΦD5andΦD6.3)

Capacitance Change	±20% of the initial measured value.
Tan δ	≤ 200% of the initial specified value.
Leakage Current	≤ The initial specified value.

◆ Solder ability

The lead wires shall be dipped into Methanol (JIS K 1501) or Isopropyl Alcohol (JIS K 1522 or JIS K 8839) solution of 10 ±20% Rosin (JIS K 5902) for 2 ±0.5 seconds, and then dipped into solder H63A (JIS Z 3282) at 235 ±5°C for 2 ±0.5 seconds. The depth of immersion shall be 2 to 2.5 mm of the capacitor body.

After immersion, the solder shall cover at least 3/4 of the lead wire surface immersed.

◆ Lead Strength

Pull Strength

The lead wire shall not get loose or cut off, while a parallel force is gradually applied to the lead wire up to 5N and retained for 10 second.

Bending Strength

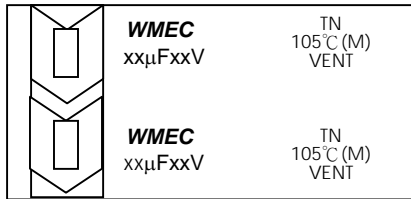
Apply the 0.25Kg weight to the end of the lead wire, and lean the capacitors body 90° and return to the original position within approximately 5 seconds. Then, repeat this cycle in the posited direction at the same speed. After that, the lead wire shall not loose or cut off.

◆ Marking

Color Style: golden marking on black sleeve.

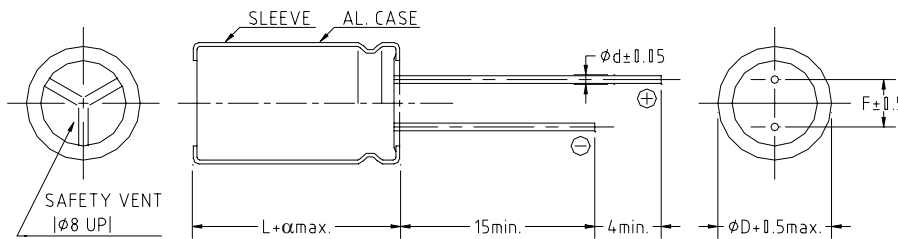
The following items shall be marked on each capacitor.

Example:



- (1) Series Name
- (2) Maximum Operating Temperature
- (3) Capacitance Tolerance
- (4) Safety Device Marking
(Safety vent more than 8mm Diameter product)
- (5) Polarity
- (6) WMEC Electronics Co., Ltd. Marking
- (7) Nominal Capacitance
- (8) Rated Voltage

◆ Dimensions (mm)



ϕD	5	6.3	8	10	13	16	18
F	2.0	2.5	3.5	5.0		7.5	
ϕd	0.5		0.5or0.6	0.6	0.6or0.8	0.8	
α	1.0			1.5			

◆ Ripple Current Coefficients

Frequency Multipliers

Freq.(Hz)	60(50)	120	1K	10KHZ	100KHZ \leq
Cap.(μF)					
4.7~33	0.45	0.55	0.75	0.90	1.00
39~330	0.60	0.70	0.85	0.95	1.00
390~1000	0.65	0.75	0.90	0.98	1.00
1200~6800	0.75	0.80	0.95	1.00	1.00

Temperature Multipliers

Temp. (°C)	40	60	70	85	105
Coefficient	2.4	2.1	1.78	1.65	1.00

◆ Case Size & Permissible Max. Ripple Current Case Size : ϕ D×L (mm)
 Max. Ripple Current : mA (rms) (105°C, 120Hz)

Case Size (ϕ D×L)mm	6.3			10		
	Capacitance	Impedance	R.C. (mA rms)	Capacitance	Impedance	R.C. (mA rms)
	(μ F)	(Ω) max. 25°C /100k Hz	105°C 100kHz	(μ F)	(Ω) max. 25°C 100k Hz	105°C 100kHz
5x11	150	0.30	250	100	0.30	250
6.3x11	330	0.13	405	220	0.13	405
10x13	560	0.072	760	470	0.072	760
8x16	820	0.056	995	680	0.056	995
8x20	1200	0.041	1250	1000	0.041	1250
10x13	1000	0.053	1030	680	0.053	1030
10x16	1200	0.038	1430	1000	0.038	1430
10x20	1500	0.023	1820	1200	0.023	1820
10x23	2200	0.022	2150	1500	0.022	2150
13x25	3300	0.030	2360	2200	0.021	2360
13x25	3900	0.018	2770	3300	0.018	2770
13x30	4700	0.016	3150	3900	0.016	3150
13x35	5600	0.015	3290	4700	0.015	3290
16x20	5600	0.018	3000	3900	0.018	3000
16x25	6800	0.016	3290	5600	0.016	3290

Case Size (ϕ D×L)mm	16			25		
	Capacitance	Impedance	R.C. (mA rms)	Capacitance	Impedance	R.C. (mA rms)
	(μ F)	(Ω) max. 25°C /100k Hz	105°C 100kHz	(μ F)	(Ω) max. 25°C 100k Hz	105°C 100kHz
5x11	56	0.30	250	47	0.30	250
6.3x11	120	0.13	405	100	0.13	405
8x12	330	0.12	760	220	0.072	760
10x17	470	0.056	995	330	0.10	995
8x20	680	0.041	1250	470	0.041	1250
10x13	470	0.053	1030	330	0.053	1030
10x16	680	0.038	1430	470	0.038	1430
10x20	1000	0.045	1820	680	0.040	1820
10x23	1200	0.022	2150	820	0.022	2150
13x20	1500	0.021	2360	1000	0.031	2360
13x25	2200	0.018	2770	1500	0.018	2770
13x30	2700	0.016	3150	1800	0.016	3150
13x35	3300	0.015	3290	2200	0.015	3290
16x20	2700	0.018	3000	1800	0.018	3000
16x25	3900	0.016	3290	2700	0.016	3290

◆ Case Size & Permissible Max. Ripple Current Case Size : ϕ D×L (mm)

Max. Ripple Current : mA (rms) (105°C, 120Hz)

Case Size (ϕ D×L)mm	WV CAP(μ F)	35			50		
		Capacitance	Impedance	R.C. (mA rms)	Capacitance	Impedance	R.C. (mA rms)
		(μ F)	(Ω) max. 25°C /100k Hz	105°C 100kHz	(μ F)	(Ω) max. 25°C 100k Hz	105°C 100kHz
5x11	33	0.30	250	22	0.34	238	
6.3x11	56	0.13	405	56	0.14	385	
8x12	150	0.072	760	100	0.074	724	
8x16	220	0.056	995	120	0.061	950	
8x20	270	0.041	1250	180	0.046	1190	
10x13	220	0.053	1030	150	0.061	979	
10x16	330	0.038	1430	220	0.042	1370	
8x20	470	0.120	1025	270	0.030	1580	
10x23	560	0.022	2150	330	0.028	1870	
13x20	680	0.021	2360	470	0.027	2050	
13x25	1000	0.018	2770	560	0.023	2410	
13x30	1200	0.016	3150	680	0.021	2860	
13x35	1500	0.015	3290	820	0.019	2960	
16x20	1200	0.018	3000	820	0.023	2730	
16x25	1800	0.016	3290	1000	0.021	3010	

6. Packaging Specification

Case size ΦD×L (mm)	Plastic Bag Capacity	Small Box Capacity		Carton Box Capacity		Small Box Size			Carton Box Size		
	pcs. / per bag	Bag / per small box	pcs. / per small box	small box / per carton box	pcs. / per carton box	L (mm)	H (mm)	W (mm)	L (mm)	H (mm)	W (mm)
4×5	500	50	25,000	2	50,000	300	295	225	470	310	310
5×5	500	50	25,000	2	50,000	300	295	225	470	310	310
6.3×5	500	50	25,000	2	50,000	300	295	225	470	310	310
4×7	500	50	25,000	2	50,000	300	295	225	470	310	310
5×7	500	50	25,000	2	50,000	300	295	225	470	310	310
6.3×7	500	40	25,000	2	50,000	300	295	225	470	310	310
5×11	500	40	20,000	2	40,000	300	295	225	470	310	310
6.3×11	500	30	15,000	2	30,000	300	295	225	470	310	310
8×12	250	40	10,000	2	20,000	300	295	225	470	310	310
8×16	250	30	7,500	2	15,000	300	295	225	470	310	310
8×20	200	25	5,000	2	10,000	300	295	225	470	310	310
10×12/13	200	25	5,000	2	10,000	300	295	225	470	310	310
10×17	200	25	5,000	2	10,000	300	295	225	470	310	310
10×20	200	25	5,000	2	10,000	300	295	225	470	310	310
13×21	100	25	2,500	2	5,000	300	295	225	470	310	310
13×25	100	25	2,500	2	5,000	300	295	225	470	310	310
13×30	100	25	2,500	2	5,000	300	295	225	470	310	310
16×26	100	6	600	4	2,400	300	145	225	470	310	310
16×31	50	10	500	4	2,000	300	145	225	470	310	310
16×36	50	8	400	4	1,600	300	145	225	470	310	310
18×21	50	6	300	4	1,200	300	145	225	470	310	310
18×40	50	6	300	4	1,200	300	145	225	470	310	310
22×40	50	4	200	4	800	300	145	225	470	310	310
25×40	25	8	200	4	800	300	145	225	470	310	310

The following items shall be marked on the box.

WMEC®		Customer	
WMEC P/N		PO. No.	
Lot No.		Customer P/N	
Final Date		Description	
Inspection		Quantity	PCS.

◆ Other

For other specifications, Characteristic W of JIS C 5141 shall be satisfied.

Aluminum Electrolytic Capacitors may be damaged by corrosion, which is caused by and halogenated hydrocarbon solvents.

Please let us know in advance the solvent name and conditions for your P.C.B. cleaning.

We guarantee our products without any prohibited substance about environment.